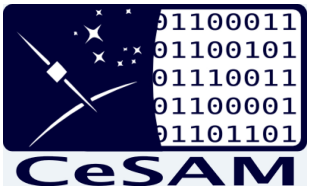

ETC-42 : Universal Exposure Time Calculator

Version 0.3.X

ETC-42 : User Manual

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Abstract

This document focuses on the set-up and basic use of the ETC software

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1 CeSAM

CeSAM([1]) (**Ce**ntre de donnée**S** **A**strophysiques de **M**arseille) is the Data Center For Astrophysical Data in Marseille. *http://projets.oamp.fr/projects/etc*

2 Introduction

This document describes the way to use the ETC-42. It will guide the user to the main steps to be able to take advantage of all capabilities of the software. First of all, it goes through the installation processes (section 3) and shows a typical use of the ETC-42 (section 4). Specific aspects on each part of the software are explained in section 5.

3 Installation

3.1 Getting the latest ETC

The latest version of the ETC-42 can be found in the project page : *http://projets.oamp.fr/projects/etc/wiki/Downloads*. The site makes available the last built software as well as the last stable distribution.

3.2 Local installation

Download the application through the Web site cited above and save it in a directory in a local environment.

3.3 Constraints

ETC-42 has been tested on Mac OS 10.6, and linux Fedora. It needs Java 6 to run. The minimum requirements to run ETC-42 are 50 Mbytes disk space and 256 Mbytes RAM. The ETC-42 is a Java application. The only requirement is to have Java 6 or higher (ETC-42 is not compatible with Java 5 or earlier). The ETC-42 bundle contains all the necessary libraries, so no other installation is necessary. For the successful execution though, the program should have write access to a directory (preferably the home directory of the user) where its configuration will be installed, as well as to the temporary directory of the system (where the operating system creates by default the temporary files).

4 Start Using ETC-42

4.1 Graphical Start

Once you have the JAR file, you can launch the command : java -jar ETC.jar, or in case of Windows and Mac OS, double click on the Jar icon to launch the application. The application will deploy itself with the creation of specific software directories. Please read the *ETC-42 technical Manual* ([2]) for more details on the application deployment and technical notes. In case the software is launched for the first time, a window pops-up in order to update/create

the local data base. Click on Yes. In case of modification of the data base structure of future software updates, the window will pop up with this message during start up.

4.2 WebStart

The Web Start version is under development and will be soon available. Next version of the software will include such possibility.

4.3 Command line mode

Once you have the JAR file, you can launch the command : java -Detc.uiMode=cl -jar ETC-Jar-*version*.jar. This mode is described in more details in section 6.

5 Graphical interface

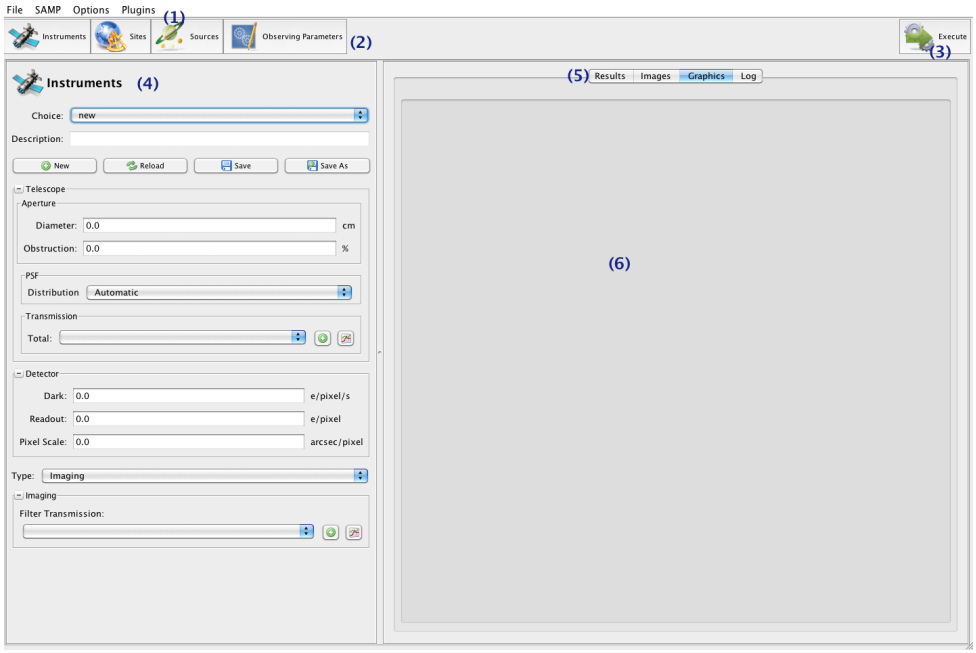
5.1 Generic iconography

The Graphical interface gathers the interfaces used for feeding the ETC-42 with needed data. Some icons and buttons are common to the different panels that are included in the software.
: The "expand" icon allows the user to expand the sub-panel
: The "collapse" icon allows the user to collapse the sub_panel
: the "plot" button allows the user to visualize the data in the graphic panel.
: the "search" button allows the user to open a local browser to choose a file.
: the "close" button allows the user to close the panel.
: the "Add" button allows the user to open a window to add new data. Clicking on this button can open some specific interfaces or a file chooser to choose data from a local file.
NEW: the "New" button allows the user to create a new data set. Depending on the panel, clicking on this button can create instrument, site, source or observing parameters.
: the "Save" button allows the user to save data. Depending on the panel, clicking on this button can save instrument, site, source or observing parameters. The Save button overwrites the previous information of the panel with the current data set.
: the "Save as" button allows the user to save data. Depending on the panel, clicking on this button can save instrument, site, source or observing parameters under a new identifier. A popup window will appear to add name and description of the new data set.
: the "reload" button allows the user to reload data from the data base undoing any unsaved modification.

The main fields required for computation are checked during the processing. However specific tests have been included in the GUI in order to validate inputs. The fields have been identified and listed in the *ETC-42 dictionary document* [3]. Please refer to this document to fill in sensible data.

5.2 Overview of the ETC-42 GUI

The general GUI drives the user to submit any computation of Exposure Time Calculation. As shown in next image, the user has access to a generic menu of the application. This menu is described in section 5.3, and gives access to configuration of ETC and exchange data facilities ((1)on image). The GUI left panel has been split in "Instruments panel", "Site panel", "Source panel" and "Observing parameters panel" ((2)on figure **??**). The characteristics of these panels are described hereafter ((3)on image). The user has to fill information on each sub panel. Please refer to sections 5.4, 5.5, 5.6, 5.7 for more explanation on how to fill parameters.
An Execute button has been set at the upper right corner of the application to launch the simulation ((4)on figure).



After execution, results are displayed in the right panel. The results panel is divided in four main tabs ("Results", "Images,"Graphics", "log") ((5)on image). Each tab has an associated panel, the content of which depends on the nature of the results ((6)on image). please refer to section 5.8 for more information on results panels.

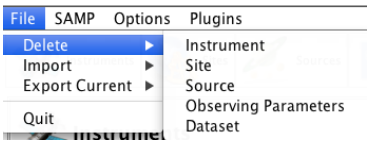
5.3 Main Menu

The main menu is composed of a textual menu which includes access to sub-menus : **"Files", "SAMP connectors facilities", "Options" and "Plugins"** and 4 icons of the different panels associated to the data to be filled in before the computation.

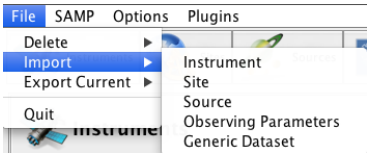
5.3.1 File

The File menu is composed of 3 sub menus :
Delete - that allows to delete some datasets that have been imported;
Import - that allows to import data from remote or user site;
Export current - that exports Instrument, site, Source and observing parameters to a local file.

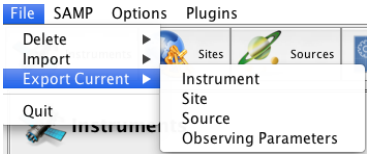
- **Delete** : The Delete menu allows the user to delete already registered data (instrument, site, source, observing parameter or dataset).



- **Import** : The Import menu allows the user to import external data which could be instrument, site, source, observing parameter or generic data sets that has previously be exported using the export facilities. Generic datasets can also be imported. Files could be imported either from local or remote server (see section 7 for more detail)



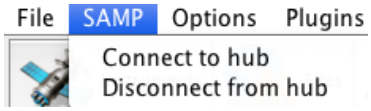
- **Export current** : The Export sub-menu allows the user to export instrument, site, source or observing parameters that is currently in use to a local file. The format of the exported file is XML. This file can be imported by other instances of ETC-42 and other users.



- **quit** : quit the application.

5.3.2 SAMP

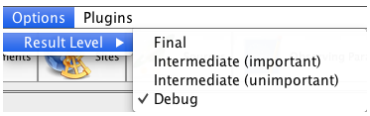
The SAMP section allows the user to connect and disconnect to the SAMP hub ([4]). This connection makes possible exchanges with other specific Virtual Observatory (VO hereafter) compatible tools. ETC-42 can import Spectral data and export any result data set as VO tables.



5.3.3 Options

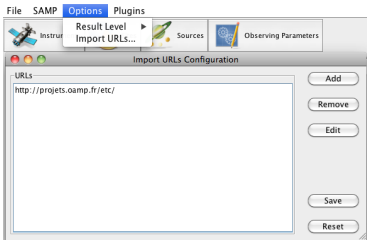
The Options menu allows the user to select the output level and the URL importing adresses.

- **Output level** : This level defines the number of outputs data accessible to the user for visualisation and/or broadcast



- final : only final results are displayed in the results panel : signal to noise ratio, total signal, background signal, detector signal
- intermediate : final results and atmospheric transmission, filter response, normalization factor, number of pixels, spatial binning value, system efficiency, and telescope area
- intermediate + : intermediate results and background flux and noise, wavelength delta, PSF, signal, signal flux, surface brightness profile, wavelength range (minimum and maximum values), zodiacal flux
- debug : intermediate+ results and all input data used for computation

- **import URLs** It gives access to the definition of the URLs the software can connect to in oreder to import ETC-42 data.



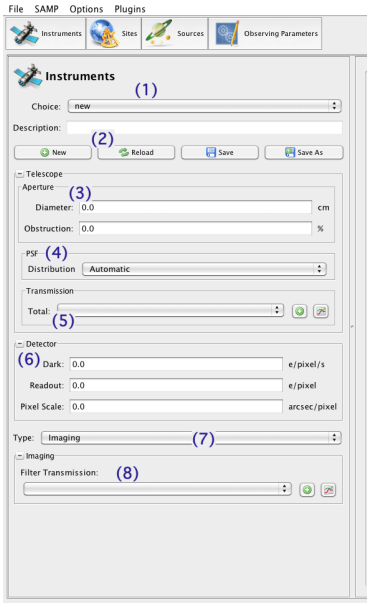
ETC-42 can retrieve specific or exported ETC-42 data from repositories. The main repository of ETC-42 is centralized in the main ETC-42 repository [5] (see section 7 for more information).

5.3.4 Plugins

This sub menu allows the user to use some plugins developed and integrated via the plugin facilities of the ETC-42. (see section 8 and the "*ETC-42-plugin framework Manual* " [6] for more details).

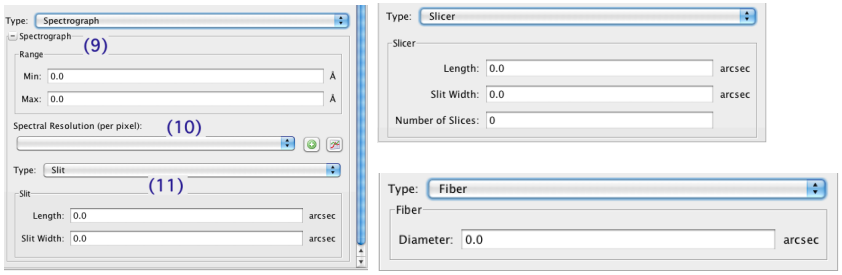
5.4 Instrument panel

Please refer to the *ETC-42 dictionary document* to fill in sensible data [3].



The "Instrument" panel is divided in three different sub panels that list the telescope inputs, the detector inputs and the instrument. The user can use either the imaging or spectroscopic observing mode. Both are accessible from the instrument panel. The first drop down menu gives access to previously registered instruments (1). The main four buttons ("New", "Save", "Save as" and "reload") (2)are described at the beginning of section 5.
To describe the instrument, the user has to describe the telescope, with information about the aperture and mirror dimensions (3). Then the distribution of the PSF should be implemented (4)in order to define the spatial distribution induced by the optical design. The user defines the total transmission of the optical system including the detector response (5). The user defines as well the detector specifications about Dark current, readout noise and the pixel scales (6). The type of observation can be either Imaging or Spectroscopy (7).

- Imaging : When choosing Imaging, the user has access to the Filter transmission that should be defined if needed(8).
- Spectroscopy : If the user selects the Spectrograph, the minimum and maximum wavelength range coverage should be defined (9). The spectral resolution of the spectroscopic device should be defined as wavelength dependant table data (10). Then specific information of the aperture of the instrument should be filled in depending on the user choice (Slit, slicer, fiber, slitless) (11).

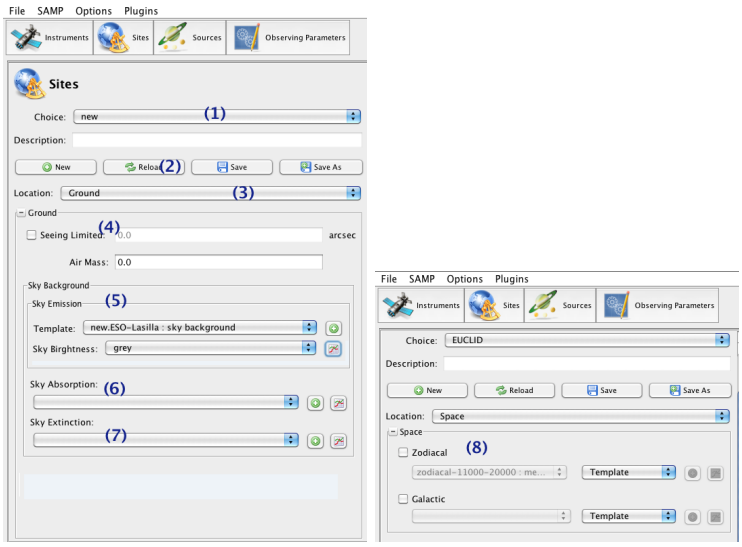


As defined beginning of section 5, wherever the "plot" button is present the user can visualize the data in the graphic panel and wherever the "Add" button is present the user can add new data.

5.5 Site panel

Please refer to the *ETC-42 dictionary document* to fill in sensible data [3].

The "Site" panel is divided in two options : ground or spaced based observation. Both are accessible from the site panel. The first drop down menu gives access to previously registered sites (1). The main four buttons ("New", "Save", "Save as" and "reload") (2)are described at the beginning of section 5.



The User has to choose between a ground base site or a space site (3). The difference comes from the presence of Atmospheric contribution. In any ground based site the major contribution to the total observation noise is due to the night sky. A balloon based observation will be considered as a ground based site as far as athmospheric contribution is dominant.
If the user chooses a ground based observation then he has to define whether the observation is seeing limited by checking out the check box and filling out the seeing value (4). The Airmass has to be filled in as well. Computing the airmass of an observation can be calculated using a plug-in to be built. It is not yet implemented

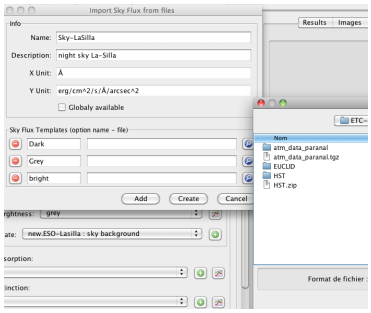
The sky background is split in three contributions :

- Sky emission (5) : the sky emission takes into account the moon phases and is based on input templates and is site dependant. Importing these templates (using the "Add button") is a bit specific and the import method is shown in section 5.5.1
- Sky absorption (6) : the sky absorption is based on input templates. It includes the atmospheric absorption features and is site dependant.
- Sky extinction (7) : the sky extinction is based on input templates. It characterizes the atmospheric extinction at zenith and is site dependant.

If the user chooses a space based observation then he has to define whether Zodiacal and Galactic contributions have to be taken into account. In case they do have, some template have to be loaded (8). Galactic contribution could be computed using plug-in functionalities (to be implemented).

5.5.1 Import Sky background

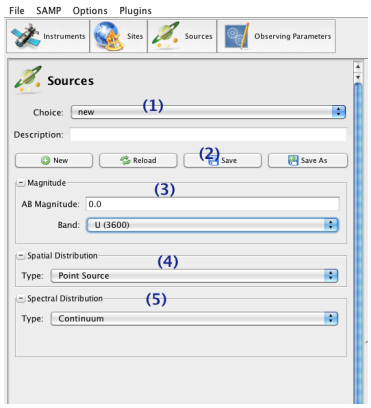
It is possible throughout the application to Import a sky emission data set by clicking on the "Add button" of the ground sub-panel of the Site panel. A popup window appears to fill in, the name of the data set, a description of it and units that are not modifiable.



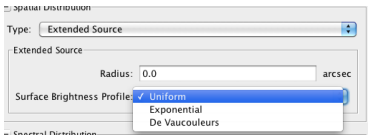
The user can decide whether the data set has to be available to the whole application or restricted to a specific site. If not, then the sky template file will be identified with the name of the current site as prefix. The "Add" button allows the user to create a new sub-data set identified by a name and a file to download using the button. The file should be a two columns, space separated, with the first column in Åand the second column in $erg/cm^2/s/Å/arcsec^2$. Data can be erased using the button. The "Create" button saves the new data and creates a new atmospheric emission data set to be used in the application.

5.6 Source panel

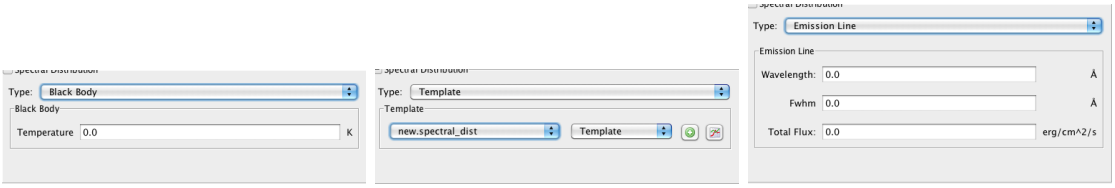
Please refer to the *ETC-42 dictionary document* to fill in sensible data [3].



The "Source" panel allows the user to define several options : from the spatial distribution of the source to the spectral energy distribution. The first drop down menu gives access to previously registered sources (1). The main four buttons ("New", "Save", "Save as" and "reload") (2)are described at the beginning of section 5.
The "Magnitude" sub-panel is shown when the total flux of the object is needed. The value is in magnitude based on the AB magnitude reference system and the user has the choice to perform the calculation on several bands as defined in the Johnson filter system (3). The user has also to define the spatial distribution of the source which could be either point like or extended (4). In the latter, size and flux distribution (uniform, exponential or de Vaucouleurs) of the object has to be added.



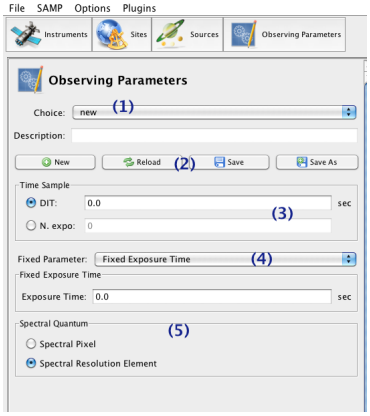
The spectral distribution of the object has also to be defined (5).



Spectral distribution can be continuum (flat spectrum wrt wavelength), emission line (defined with a central wavelength, a FWHM and the total flux of the line), template (distribution defined by the user) or Black body (defined with a temperature). Please refer to *ETC-42 dictionary document* [3] for more details.

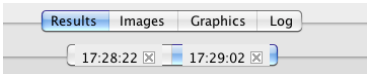
5.7 Observing parameters panel

Please refer to the *ETC-42 dictionary document* to fill in sensible data [3].



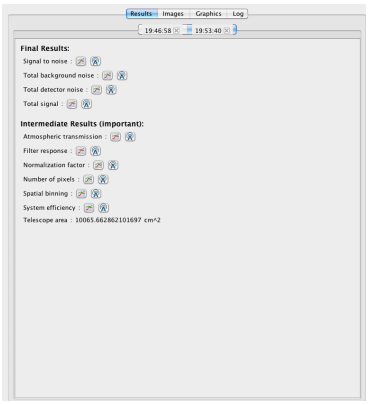
The "Observing parameters" panel allows the user to define two main options : either the user can define Signal to noise ratio at a specific wavelength or a total exposure time to calculate the distribution of Signal to Noise ratio over the wavelength range. The first drop down menu gives access to previously registered Observing parameters sets (1). The main four buttons ("New", "Save", "Save as" and "reload") (2)are described at the beginning of section 5.
In the "Time sample" sub-panel (3)the user can then define either the time for each Detection Integration Time (DIT) in sec) or the number of exposures to be taken. The dropdown button allows the user to select the mode Fixed exposure Time or Signal to noise ratio (4). The total exposure time, the DIT and the number of exposures N_{expo} are linked by the equation : $T_{expTime} = N_{expo} * DIT$.
If "Fixed exposure time" is selected the user has to fill in the total exposure time. The total exposure time does not take into account the "overheads time".
If "Signal to noise ratio" is selected the user has to fill in the SNR target value and the wavelength to measure the SNR. The spectral Quantum sub-panel allows the user to select the spectral element for the spectrum output (5). It could be "pixel" or "resolution element". Please refer to the *ETC-42 technical Manual* [2] for more details.

5.8 Results panel



The results panel is split in four sub panels : the result panel gathers the results in a textual mode with links to graphics and images. The image panel shows the images computed. The graphic panel shows results as graphics. The log panel lists the commands launched for the computation. Each computation open a new window identified by the time when the process has been launched.

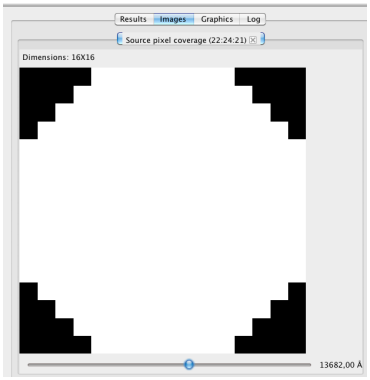
5.8.1 Results panel



The Results sub-panel gathers the results of the computation. The results panel content depends on the configuration set up in the options menu (section 5.3.3). Each result is presented as line with icons at the end of the line. To get more information on the available results please refer to the *ETC-42 technical Manual* ([2])
Depending on the nature of the results different icons can appear at the end of the line. If the result can be displayed as graphs the Plot icon is accessible. It is followed by the broadcast icon that allows to broadcast data as VOTable, when ETC-42 is connected to SAMP. If the result is an image then the Image icon is accessible. The execution outputs are defined in the *ETC-42 dictionary document* [3]

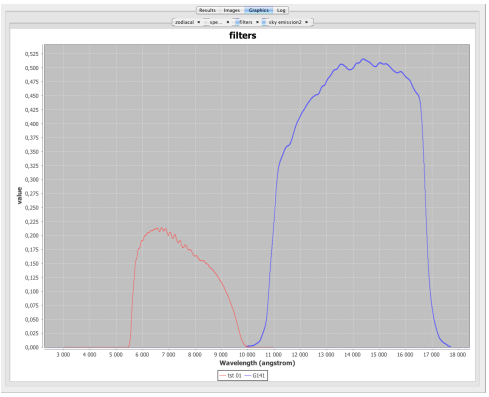
5.8.2 Image panel

When an image mode is selected, the user has access to data on the image panel. The image panel gives access to the data cube with an image of the detector matrix and a slider that give access to a specific wavelength.



5.8.3 Graphics panel

The graphic panel is based on the JFREEChart library [7]. Some modifications on the overall presentations and functionalities have been added to the basic library.



- contextual menu The graphic panel can offer several saving and exporting options. Current view can be saved as PNG image and data can be exported as ASCII files. To do so, when on a graphic , right click on the graphic window and then use the save data for the contextual menu. This menu gives the user the opportunity to modify the properties of the graphic windows such as : title, abscissae, line styles, grid, colour. It gives access to zoom in and out facilities. The menu gives access to printing options.

  When right clicking on the legend of the graph, the contextual menu gives also access to export data to a specific ascii file.

- Mouse gesture : The zoom in could be performed as well with a click and drag motion from left to right that draw a box to be zoomed in. A motion from right to left will zoom out.

- Tabs : When plotting more than one plot, tabs appear in the graphical panel. If the user wants to overplot data, the action is quite simple. Drag and drop the tab of the data on the tab you want to see them overplotted . This action will merge the two plots in one tab the title of which is "Multiplot". Double clicking on the tab will pop up a window to modify the title of the tab. Dragging the legend of a multiple plot to the TAB region, will split the plots and create a new tab and a new plot window.

5.8.4 Log panel

The log panel lists all the commands that have been executed by the user. The commands that are listed are those described in section 6. The user can follow any modification of the set up via the log panel. Moreover, part or all the commands can be copied to a script file and executed via the script mode. This is a really nice way of testing some computation and then copy paste the commands for batch execution or multiple sessions tests in script mode.

5.9 Session example

Once the application has been launched , the user has to follow 4 steps prior launching the computation of the Signal to noise ratio. This example will show how to get computation for the observation of an emission line object with the EUCLID slitless spectroscopy instrument.

1. select an instrument On the Instrument panel (see section 5.4 for more info), the user can select an instrument that already exists using the dropdown button. If the instrument does not exist, the user has to fill in the different data needed for computation :

   - Aperture-Diameter : 120 cm (Diameter of the mirror)
   - Aperture-Obstruction 5% (Obstruction induced mainly by the secondary mirror)
   - PSF - Distribution : Automatic (the computation of the PSF is based on the diffraction limit)
   - Transmission - Total : The user has to import a file with a constant global transmission of 0.4 (mean value) for the overall range of wavelength (11000 up to 20000 Å). For that purpose, click on the "Add" button that will open you a download page
   - Detector-Dark : 0.05 e/pixe/s
   - Detector-Readout : 7.0 e/pixel
   - Detector- PixelScale : 0.3 arcsec/pixel
   - Type : Choose *spectrograph* with the dropdown button
   - Spectrograph-Range-Min : 11000 Å
   - Spectrograph-Range-Max : 20000 Å

- Spectrograph-Spectral Resolution per pixel : The user has to import a file with covering the overall range of wavelength with linear value of 275 Å/*pixel* at 11000 Åup to 510 Å/*pixel* at 20000 Å. For that purpose, click on the "Add" button that will open you a download page
- Spectrograph - Type : Choose *Slitless* with the dropdown button

2. select a site : on the site panel (see section 5.6 for more info), the user can select a site that already exists using the dropdown button. If the site does not exist, the user has to fill in the different data needed for computation.
   - Location : Choose *Space* with the dropdown button
   - Space-Zodiacal : The user has to import a file with with values covering the overall range of wavelength (from 11000 Åup to 20000 Å). For that purpose, click on the "Add" button that will open you a download page

3. select a source : on the Source panel (see section 5.6 for more info), the user can select a source that already exists using the dropdown button. If the source does not exist, the user has to fill in the different data needed for computation.
   - Spatial Distribution -Type : Choose $ExtendedSource$ with the dropdown button
   - Spatial Distribution - Extended Source - Radius: 1.0 arcsec
   - Spatial Distribution - Extended Source - Surface Brightness Profile : Choose $Uniform$ with the dropdown button
   - Spectral Distribution - Type : Choose $EmissionLine$ with the dropdown button
   - Spectral Distribution - Emission Line - Wavelength : 12500.0 Å
   - Spectral Distribution - Emission Line - FWHM : 10 Å
   - Spectral Distribution - Emission Line - Total FLux : $1.0 \times 10^{-13} erg/cm^2/s$

4. select a specific observing parameters set : on the Observing parameters panel (see section 5.7 for more info), the user can select a parameters set that already exists using the dropdown button. If the parameters set does not exist, the user has to fill in the different data needed for computation.
   - Time Sample N-expo : 2
   - Fixed Parameters - : Choose $FixedExposureTime$ with the dropdown button
   - Fixed Exposure Time -Exposure Time : 540 s

5. launch the computation : click on the EXECUTE button on the upper right corner of the application

6. analyse the results : the results are displayed in the Results panel (see section 5.8 for more info) Depending on the level of Result-level you have set (see section 5.3)[Options->Result-Level]. The results are shown as graphical plot icons. Depending on the plot you really want to see, click on the icon.

   For example :

- Signal to noise : This will draw the distribution of the signal to noise ratio over the wavelength range. The plot is automatically loaded in the Graphics window. Possibilities of the graphical panel are defined in the section 5.8.3. From the results panel the user can plot many other quantities.
- Total Signal : This will draw the distribution of the total signal received over the wavelength range.

  The graphics can be overplotted using drag and drop functionalities. The graphic window allows to zoom in and out and rename the axis (see section 5.8.3 for more info).

7. Replaying the simulation : Once the simulation has been launched, the user can have a look at the Log window and can save the commands into a file (the user open a text editor and can make a copy/paste of selected commands). This file will be replayed using the command line mode facilities (see section 6 for more info).

6 Command line mode

To launch the ETC-42 in command line mode it is necessary to launch the command : "java -Detc.uiMode=cl -jar ETC-Jar-*version*.jar" . This action will give access to the command lines and the user will be able to prepare and run a script or commands. Type *help* under the ETC-42 prompt to have access to the available commands. The available commands are :

- calculate : Executes a SNR calculation with the current configuration. Usage: calculate
- cd : Changes the current directory. Usage: cd <new directory>
- current : Gives information about the current configuration. Usage: current <type> ; where <type> can be any of the following: (empty): to get the names of the components in use ; instrument or i: to get information about the current instrument ; site or si: to get information about the current site ; source or so: to get information about the current source ; obsparam or o: to get information about the current observing parameters
- echo : Prints out on the screen a message. Usage: echo <message>
- exit : Exits the program. Usage: exit.
- help : Gives a description how to use a command. Usage: help <command> ; where <command> can be any of the available ETC commands. If it is empty, then a list of all the available commands is shown.
- list : Gives a list of the available components. Usage: list <type> ; where <type> can be one of the following: instrument or i: to get the available instruments, site or si: to get the available sites, source or so: to get the available sources, obsparam or o: to get the available observing parameters
- load : Loads a component. Usage: load <type> <name> ; where <type> can be any of the following: instrument or i: to load an instrument, site or si: to load a site source or so:

to load a source, obsparam or o: to load observing parameters and <name> is the name of the component to be loaded

- ls : Prints out the contents of the current directory. Usage : ls
- mkdir : Creates a directory. Usage: mkdir <new directory>
- outlevel : Sets the level of results to be saved. Usage: outlevel <level> ; where <level> can be one of the following: 0: Only final results are saved, 1: Also important intermediate results are saved, 2: All the intermediate results are saved, 3: All the results are saved (debug mode)
- outprefix : Sets the prefix which will be used for the files where the results will be saved. Usage: outprefix <prefix> ; where <prefix> is a string consisting of letters, numbers or the underscore (_)
- pwd : Prints out on the current directory. Usage: pwd.
- save : Saves permanently modifications of the current configuration. Usage: save <type> ; where <type> can be any of the following: instrument or i: to save the current instrument, site or si: to save the current site , source or so: to save the current source, obsparam or o: to save the current observing parameters
- set : Sets a parameter of a component. Usage: set <type> <parameter> <value> ; where <type> can be any of the following: instrument or i: to load an instrument, site or si: to load a site , source or so: to load a source, obsparam or o: to load observing parameters. <parameter> is the name of the parameter to be set and <value> is the new value of the parameter (optional). Available parameters are
  - instrument
    - Dark
    - Diameter
    - FiberDiameter
    - FilterTransmission
    - FWHM
    - InstrumentType
    - NSlit
    - Obstruction
    - PixelScale
    - PsfType
    - RangeMax
    - RangeMin
    - Readout
    - SlitLength
    - SlitWidth

    - StrehlRatio
    - RefWavelength
    - SpectralResolution
    - SpectrographType
    - Transmission
- Site
    - AirMass
    - GalacticContributing
    - SeeingLimited
    - GalacticProfile
    - LocationType
    - Seeing
    - SkyAbsorption
    - SkyEmission
    - SkyEmissionSelectedOption
    - SkyExtinction
    - ZodiacalContributing
    - ZodiacalProfile
    - ZodiacalProfileType
    - GalacticProfileType
- Source
    - Band
    - EmissionLineWavelength
    - EmissionLineFWHM
    - ExtendedSourceProfile
    - ExtendedSourceRadius
    - Magnitude
    - Redshift
    - Temperature
    - SpatialDistributionType
    - SpectralDistributionTemplate
    - SpectralDistributionType
    - SpectralDistributionTemplateType: TEMPLATE
    - EmissionLineFlux
- Obsparams
    - Dit
    - ExposureTime
    - FixedParameter

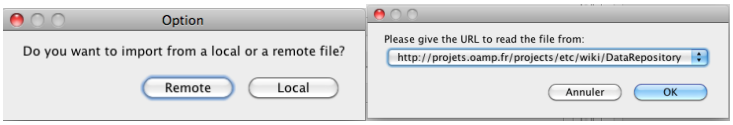
* NoExpo
* Snr
* SnrBand
* SnrBandType
* SnrLambda
* TimeSampleType
* SpectralQuantumType

For more information about the parameters please refer to the *ETC-42 dictionary document* [3]

- script : Runs the commands from a file as a script. Usage: script <file> ; where <file> is the file containing the commands
- sh : Executes a system command. Usage: sh <command>

7 Import data

When Using the Import facilities from the menu, the user has access to the possibility to use a local file or to download data from a remote site.



A remote site has been defined to import data relevant to the ETC. This site can be accessed using the address : *http://projets.oamp.fr/projects/etc/wiki/DataRepository*. The goal of this site is to gather any contribution that could be relevant to the ETC.

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DataRepository¶
In this page you can find XML files containing ETC-configuration for a list of instruments, sites and sources. You can download locally the files in your computer and import them as files, or you can directly connect to this page from the "Remote" option of the ETC-42. Note that the available files are depended on the database structure, so be sure you download the files for the correct version (some files work in multiple versions).
Files for version: 0.3.0¶

New sources, sites, instruments or datasets that could be used by other people can be accessible by this web site. For proposing a contribution please feel free to propose a new "issue ticket" to the project page : *http://projets.oamp.fr/projects/etc*.

8 Plug in

ETC-42 implements a way to include plugins. These plugins are some tools developed apart from the ETC that can be linked to the ETC. The interfaces have been defined. It is now simple

to implement some plugin into the ETC. see the plugin paper [6] to get more information on the way to build and integrate some plugin in the ETC.

9 Evolutions

We are working on some evolutions of the ETC for the near future :

1. Implementation of the Adaptive Optics : Adaptive Optics is becoming the standard way ofor ground based telescope observations. We plan to implement basic AO noise contribution (wrt Strehl ratio) and GLAO observations.

2. Implementation of confusion noise : The confusion noise is really important when observing the deep fields. depending on cosmological models we could implement the contribution of the confusion noise in observations.

3. Implementation of Images simulations.

4. Implementation of aladin communication for defining position and size of the Object to observe. This link can define the galactic and zodiacal contributions to observation, as well as the airmass of the observation.

    - Plugin developments
        - Computing the airmass of an observation with position.
        - Computing Galactic contribution with position.

References

[1] CeSAM, Centre de Donnees Astrophysique de Marseille
http://lam.oamp.fr/cesam.

[2] ETC-42 : *ETC-42 technical Manual*
http://projets.oamp.fr/projects/etc/wiki/Documentation

[3] *ETC-42 dictionary document*
http://projets.oamp.fr/projects/etc/wiki/Documentation

[4] International VirtualObservatory Alliance
http://www.ivoa.net/Documents/latest/SAMP.html

[5] ETC-42 : repository
http://projets.oamp.fr/projects/etc/wiki/DataRepository

[6] ETC-42 : *ETC-42-plugin framework Manual* :
http://projets.oamp.fr/projects/etc/wiki/Documentation

[7] JFreeChart
http://www.jfree.org/jfreechart/

[8] International VirtualObservatory Alliance
http://www.ivoa.net/